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UNPUBLISHED PRELIMINARY DATA

Post-buckling Behavior of Cylindrical Shells

A study has been initiated and completed on the maximum strength in the post-buckling domain of pressurized cylinders subjected to axial compression. This work, performed by Professor John W. Hutchinson, utilizes a very simple analytical scheme that is in the spirit of Koiter's general theory of post-buckling behavior of structures and provides quantitative as well as qualitative results for the dependence of buckling strength on internal pressure. The paper has been submitted for publication to the AIAA Journal.

Dynamic Buckling of Imperfection Sensitive Structures

Based on earlier work by Hutchinson and the undersigned, work has been initiated and completed on the dynamic buckling loads for structures subjected to transient loads of finite duration. The results provide simple estimates for structures in general, being dependent only on the nature of the load history, the pertinent natural frequency of small vibration of the structure, and its imperfection sensitivity as measured by the reduction of its actual static buckling load from the classical load. A paper on this work will be prepared and submitted to the AIAA Journal.

Cracks in Cylinders

A study has been initiated by Dr. V. T. Buchwald of the University of Sydney (visiting Research Fellow) of the stress distribution around a semi-infinite crack in a pressurized circular cylinder. This is a very basic problem in the field of fracture mechanics; it is not yet clear whether a complete analytic solution is feasible.

Asymptotic Analysis of Stresses Around Holes in Circular Cylinders

In the limiting case of very small thickness conventional series techniques for the analysis of stresses around holes in circular cylinders breaks down; graduate student John Wivorkoski is studying this problem and has made significant progress in obtaining rigorous asymptotic solutions.

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